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ADAPTING ENVIRONMENTAL EDUCATION FOR A VIRTUAL SPACE

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https://doi.org/10.37099/mtu.dc.etdr/1121

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ADAPTING ENVIRONMENTAL EDUCATION FOR A VIRTUAL SPACE

By

Jennifer M. Klemm

A REPORT

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

In Applied Ecology

MICHIGAN TECHNOLOGICAL UNIVERSITY

2020

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This report has been approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE in Applied Ecology.

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Acknowledgements

First and foremost, thank you so much to Dr. Bal for bearing with me through everything that went into writing this report. A most gracious thank you to Dr. Orr and Dr. Carter for agreeing to be on my committee – and an additional thank you to the former for guiding me through the VISTA process and all of his support throughout this degree. For being a constant source of inspiration and motivation with all of the program pivots, thank you to Emily Vogelgesang. Thank you to everyone else at Huron Pines and Huron Pines AmeriCorps who I had the pleasure to work and serve with this year. Finally, a special thank you to Shallen Gurtler, Chance Sherratz-Hayes, and Emily Bischoff for reading through the early drafts and providing outside feedback.

Definitions

The following are scientific binomials for organisms referenced in this report:

Plants

Autumn olive (*Elaeagnus umbellata*: Elaeagnaceae)

Common buckthorn (*Rhamnus cathartica*: Rhamnaceae)

Glossy buckthorn (*Frangula alnus*: Rhamnaceae)

Jack pine (*Pinus banksiana*: Pinaceae)

Japanese barberry (*Berberis thunbergii*: Berbericeae)

Purple loosestrife (*Lythrum salicaria*: Lythraceae)

Animals

Kirtland's warbler (*Setophaga kirtlandii*: Parulidae)

Sandhill crane (*Grus canadensis*: Gruidae)

List of abbreviations

CCCOA – Crawford County Commission on Aging

EE – Environmental Education

GIS – Geographic Information System

GPS – Global Positioning System

HP – Huron Pines

HPA – Huron Pines AmeriCorps

MISIN – Midwest Invasive Species and Identification Network

NEMIGLSI – Northeast Michigan Great Lakes Stewardship Initiative

VISTA – Volunteer(s) in Service to America

Abstract

Incorporating virtual education offerings with traditional environmental education delivery can be a complementary pairing. In addition to giving instructors more flexibility by increasing their toolkit, it can also increase potential offerings and engagement opportunities for an organization. Since virtual programs offer the chance for them to be shared beyond the initial audience with no significant increase in time, they can allow instructors to focus on developing other projects. This report studies content delivered by an environmental education specialist at Huron Pines, Gaylord, Michigan from February to October 2020. The environmental education specialist created virtual, nine-part series, *Connecting to Nature*, in April and May of 2020 as a response to the COVID-19 shutdown of in-person education. The program initially had comparable or better turnout for the live, online sessions (n=244) to previous programming at Huron Pines, and recordings of the sessions had continuous engagement through a virtual platform, YouTube, (n=479 April-October 2020). Two additional series were created in order to explore environmental education online for Huron Pines, as well as train participants to report invasive species to the Midwest Invasive Species and Identification Network. Online programs had the potential to reach larger audiences and provide continuous opportunities for participants to engage with Huron Pines' content. By utilizing a dual approach to environmental education, where fieldwork and computer learning coexist, outdoor-related content can be maintained while engaging participants in environmental education.

1 Introduction

Traditionally, environmental education (EE) conjures up the image of aspiring naturalists in the field with only a few scraps of paper on a clipboard eagerly discovering the mysteries of natural phenomena, usually with an aged instructor encouraging them to be a part of the ecosystem. While that is still true today, there is considerable benefit in embracing technology's role in environmental education. This is especially relevant when considering the idea of virtual classrooms and ecological learning at a distance.

EE and literacy are key pieces of any science education program. A broad subject, EE can include various subfields which relate to the environment as a whole, such as geology or geography. While hard to define, as much of EE seems intuitive, in general EE promotes an awareness of the environment as a whole, as well as the various factors that influence it (Kaya and Elster, 2019). As Kaya and Elster (2019) emphasize, it is up to teachers to reinforce the importance of environmental issues in their curriculum. A key way of educating students is through teaching them environmental literacy, which is characterized by students' ability to assess health of environmental systems and know the underlying ecological actions surrounding them (Kaya & Elster, 2019). Even going beyond learning for the sake of learning, environmental literacy allows participants to better engage in their communities through critical thinking about the effects of humans on the surrounding ecosystems (Minner & Klein, 2016). Since humans coexist with the natural world, it is key to understand our place in those systems. Our current environmental models face systemic problems which need to be updated to reflect our

rapidly changing environment (Jorgenson et al., 2019). As our technologies advance, so too can our education potential.

Certain technologies are now ubiquitous with various environmental subfields. After all, a wide variety of disciplines utilize GIS and GPS techniques, both ever-increasing in appeal due to their broad applications. Yet the idea of teaching field courses online causes many to balk at the thought. There is a perceived difference in how both of those techniques can be envisioned to be implemented in classrooms. When considering online courses for students of any age in environmental education, some questions that come to mind may be: *How can students cultivate an appreciation for the natural world while cooped up in small spaces being inundated by harsh artificial lights unable to engage every sense with the content? How well can one learn about fungus among us, without being bathed in the scent of early morning dew in a local forest system? To what extent can the senses be incorporated into educational lessons?*

Technology is an inevitable part of virtually every field that exists today. Some areas have been slower to embrace that inevitability; COVID-19, while being tragic in so many ways, gave us the chance to re-evaluate long held assumptions surrounding our educational systems (Shenoy et al., 2020). We now have opportunity to transform in-person elements of environmental education and long-term applications of previously underutilized technology. Since the virus is unlikely to be contained within the next year, online courses will be exceedingly important (Toquero, 2020). Due to the necessarily quick responses on the parts of educators, many of the programs are being reinvented on an unprecedented scale (Shenoy et al., 2020).

When we think about online learning, there can be some confusion as there are a variety of words used to describe it – and many are used interchangeably (Moore et al., 2011). Generally online learning which is meant to simulate the in-person education experience is considered to be synchronous as it allows for more interactivity between educators and participants (Skylar, 2009). Whereas asynchronous approaches allow for self-paced learning through more text or video-based materials than interactive instruction (Skylar, 2009). It is generally viewed as having minimal interaction between students and teachers. However, even the term "online learning" can be contentious, as it can refer to the whole field of learning online, reference the particular technology, as an updated version of "distance learning", or even as a synonym for synchronous education (Moore et al., 2011). Even the term "distance learning" has its own history and contested semantics (Moore et al., 2011). Within this report, online and distance education are viewed as relatively synonymous for learning that takes place at a distance, generally online. For simplicity, the term "virtual" is used to indicated that the education takes place in a virtual space. The majority of Huron Pines' educational programing during 2020 could be categorized as synchronous learning, with elements of asynchronous learning, since many of the virtual sessions were held live with participants who were able to interact with the presenter(s). Virtual offerings can work in conjunction with in-person lessons, or even enhance them, by giving students safe avenues to explore on their own schedule with the information to guide them (Whitehouse, 2008; Paul & Jefferson, 2019). As Whitehouse (2008) noted, having all materials available at the start of a semester consistently improved students' scores for the course they looked at and even "secured [it] as a continued offering in lean financial times" due to the student

engagement. Overall, research suggests that online courses can increase student engagement. For example, Shenoy et al. (2020) found that when engaging university students virtually, their attendance was nearly 100% which was twenty times better than it had been before moving the lessons online. One distinct advantage of virtual lessons is that they can be recorded, meaning that students could take them into the field with them to review content while engaging in tactile learning. Videos showing practical methods or techniques were more useful in those instances than definition based content for visual or tactile learners. Virtual offerings, whether they are online or distance-based, can help supplement in-person programs.

These measures may not be necessary long-term, but as we learn how to adapt to what some call the "new normal" it is important to explore all of our options. Noted by Fan et al. (2020), the majority of students and educators own mobile devices which are comparable to desktop computers; the capacity to teach and learn from a device is present. Social media applications are also more likely to be used by students overall than any other non-academic applications (Fan et al., 2020). Additionally, the majority of college-age students take in their news through social media (Chung et al., 2020). Since students are using mobile devices and utilize social media for news, it seems natural for educators to use these to their advantage.

One piece of technology that educators can readily utilize is a mobile phone. Mobile phones can be used to enhance student learning, even in environmental education (Ferry, 2009). However, as Ferry (2009) noted there were a few drawbacks. One of the most notable was the difficulty teachers had in uploading audio from the mobile phones to the

computer after recording a lesson. Yet, that was back in 2009 when mobile phones were not the "smartphones" available now. Consider too, that mobile phones were also not ubiquitous even among educators at that time. While those findings were valid, especially for the time, many of the drawbacks seen are not applicable to most modern phones. In fact, modern smartphones have the ability to utilize video calling software allowing meetings to happen even without access to a laptop. Video calling software can also be used to promote virtual education -- as we are undoubtedly familiar with by this point.

From a teaching perspective, as Ferry (2009, p. 45) noted, teachers "need visions of the educational possibilities that the technology can provide" before they can feel compelled to include it in their curriculum. In this report, some of the ways in which teachers can – and should – bring simple technologies into their environmental education classrooms are documented and evaluated. Many of the students and teachers are already familiar with technology, it should not be necessary in most cases to teach students how to use the technology (other than cursory overviews) and instead the time can be used to focus on the content itself. Shenoy et al. (2020) also found that as teachers became accustomed to virtual education commuting lessened and more time could be spent at home. By incorporating more novel educational elements, EE teachers can be involved in "practice innovation" helping to revolutionize the current teaching models (Li & Krasny, 2019; Payne et al., 2020). Additionally, online teaching can benefit because educators are experiencing it together, which allows for the potential to increase communication through shared resources and reducing isolation (Briano et al., 1997). With conferences moving online, as well as open online courses for educators available, there are a wealth

of resources for educators who want to improve their virtual offerings and connect with fellow teachers (DuBois et al., 2017; Tabuenca et al., 2019). Becoming more involved with online offerings can help to address the blind spots in various fields by creating opportunities for educators to expand their knowledge in interdisciplinary ways (Reid et al., 2019).

Huron Pines' programming made use of Zoom's polling function, in order to keep participants mentally active while simultaneously demonstrating learning. Having polls allowed any issues in comprehension to be addressed at that time instead of the audience leaving confused. This was because polling generally used questions to gauge participant understanding of the topic, and then allowed for any questions to be addressed in the moment. While it helps to have attendees already familiar with the software, simple messaging and clear directions can function effectively. By addressing the tools used later in the presentation during the beginning participation can be aided and questions surrounding the polling process can be minimized, as any source of potential confusion can be met preemptively.

Part of what makes programs – especially virtual programs – engaging is having anecdotes and "insider information" to share with participants. Much of that educators can only get by having put hours in the field, which they can then turn into a more readily accessible presentation for anyone. Not every person wants to go out in the field, nor do they always need a full session in the field to be prepared, which is where virtual programming can increase its reach. Educators who can provide that insider look for their

students can help them connect to the subject in novel ways, despite not always being able to facilitate field excursions.

Firsthand experience cannot be replaced, but as an educator a variety of technologies and techniques can be used to round out students' education. Distance learning offers a bridge during the current safety concerns, and also holds a wealth of possibility for even when it becomes safer for educators to hold large in-person sessions. Having the ability to reuse pre-recorded content for multiple lessons will free up educators to work on other projects, as well as increase the potential interactions that future participants can have with the material. By utilizing a dual approach to environmental education, where fieldwork and computer learning coexist, students can be prepared efficiently for their futures while not sacrificing the elements that bring people into environmental education.

2 Overview of Huron Pines

Huron Pines (HP) is a non-profit conservation organization with two offices in Gaylord and Alpena, Michigan. Primarily working within their service area, HP serves 12 counties in Northern Michigan: Cheboygan, Presque Isle, Otsego, Montmorency, Alpena, Crawford, Oscoda, Alcona, Roscommon, Ogema, Iosco, and Arenac County. Their work establishes their commitment "to conserve and enhance Northern Michigan's natural resources to ensure healthy water, protected places and vibrant communities" (Huron Pines, 2020). The healthy water and protected places they mention represent standard environmental stewardship, as they conduct stream remediation projects as well as an intense invasive species removal team. The "vibrant communities" piece represents the totality of ecosystems, including humans and our role within them, and places a strong emphasis on environmental education. Generally, their educational programs revolve around connecting those key pieces to the communities in their service area. This is accomplished through a variety of original programs, partnerships, and support of sister organizations. Through their AmeriCorps program (est. 2007), HP allows future conservation stewards a unique opportunity to practice their work in natural resources combined with a community-minded approach.

2.1 Role in Huron Pines AmeriCorps

For this Huron Pines AmeriCorps (HPA) service, I was located directly at HP as their "Environmental Education Specialist". The main service goal was to assist the Environmental Education (EE) Coordinator, Emily Vogelgesang. This combined a few aspects of Huron Pines' programming which extended beyond the environmental

education program alone. Even though the original position description became obsolete due to COVID-19, the core essence of the service remained intact. Responsibilities revolved around implementing current environmental education programs, aiding the Health and Wellness section of Huron Pines, developing new programs for other sectors, and helping with fieldwork both around the service areas and at the Huron Pines preserves. As an AmeriCorps member, both the supervisors and the program itself made sure to include plenty of opportunities for professional development – one example of this was being included in the Northeast Michigan Great Lakes Stewardship Initiative (NEMIGLSI) Conference that took place this year – as well as job shadowing of other resource professionals. Attending training sessions hosted by other HPA members was strongly encouraged. Those sessions typically involved a day-long program for AmeriCorps members, as well as other community members (in some instances). One of the trainings that was especially helpful as an environmental educator was a Project Wild and Project Learning Tree educator certification course, where participants learned how to teach EE concepts in an engaging manner. Overall, this service year provided extensive education on how to be an environmental educator, as well as serve the community even in uncertain times.

2.2 Report Objectives

In this report, creation and implementation of virtual environmental education (EE) programming for Huron Pines are documented with descriptions of participant engagement results. Additionally, four "Great Stories" which are compact narratives detailing aspects of my service term, are included as Appendix A. In general, the goal of

those stories was to reflect on moments arising during service and understand the importance of even the minute. They are included as they were written and are purely narrative accounts of heartwarming or humorous instances which occurred over the course of the year. This report serves both as a reflection of my VISTA service year with HP, as well as a springboard for future virtual programs in EE.

3 Virtual Environmental Education Creation and Implementation

3.1 Connecting to Nature Series

Due to COVID-19, the bulk of Huron Pines' (HP) environmental education (EE) programming, originally designed to be in-person sessions in the spring/summer of 2020, needed to be modified in order to safely connect with the audience. It was a scramble to create a whole new program completely from scratch while adapting to a relatively new platform for the organization, Zoom. Knowing that the Stay in Place (SIP) orders in Michigan would be in place for at least a month, a series of half-hour presentations were created which would take place every Thursday in April, 2020. Each of these sessions covered a different topic relevant to the interests and ecology of the Northern Michigan service area. Primarily they were advertised on Huron Pines' social media platforms (Facebook and Instagram), through their eNews email newsletter, and on their website. Since our goal was to connect the audience to the natural world around them, the series was titled *Connecting to Nature*. The initial five topics were:

1. "Plants & Stress"
    - Plants' methods for coping with external and internal stressors.
2. "Intro to Gardening with Native Plants"
    - Native Michigan plants which could be incorporated into landscape projects as well as the benefits of native plant gardening.
3. "Unwind Outside"

- How to engage in outdoor recreation safely while also practicing mindfulness through three sensory techniques and nature journaling.

4. “Talking Ticks”
    - An overview of common tick species, disease transmission, prevention, and removal.
5. “Intro to Invasive Species”
    - Broad overview of what invasive species are, how they invade areas, and a few local invasive species to be aware of.

Following on the heels of the initial series, a May series was also created, and took place every Thursday in May, 2020. The four presentations were presented by Huron Pines staff members. The four topics were:

1. “Understanding Stormwater” (Samantha Nellis)
    - Detailed the factors surrounding stormwater and runoff, as well as ways to reduce runoff.
2. “Bringing Birds to Your Back Yard” (Abigail Ertel)
    - An overview on basic birding and how to encourage bird-based habitation.
3. “Reading the River” (Joshua Leisen)
    - Guided walkthrough of river morphology.
4. “Protecting Wild Places” (Heather Huffstutler)
    - The origins of glacial features in Michigan and local areas of interest.

Each presentation had a moderator and presenter hosting a Zoom meeting together. In order to keep each presentation engaging, due to the variability of the audience's background knowledge –a back-and-forth style presentation was created where the moderator would feed the presenter audience questions and be a "voice" for the audience, in effect, learning alongside them. This turned the educational lesson into a podcast-like experience for attendees, but with a visual component. After every lesson, follow-up material was sent out which included a summary of key points for each presentation, vocabulary, any techniques shown, and additional learning materials (articles, videos, blog posts, presentation slides, etc.). While reviewing content to include in follow-up materials for our programs, videos that showcased helpful techniques to share back with our participants were appreciated.

To understand the educational value of these lessons, participants were asked to take a short survey following each lesson facilitated through Google Forms. During the April series, this led to 62 responses back to the surveys, out of a total of 165 live attendees, or a 38% response rate. The month of May saw a marked decrease in the number of viewers for the live sessions, with only 74 individuals, but ended up having a slightly higher response rate with 32 respondents, for a 43% response rate.

Looking across the entire series' run, when asked to respond to the statement "My knowledge on the topic increased as a result of this session" nearly 60% of total respondents replied "Somewhat" with 33% replying "To a Great Extent". Even though each lessons' usefulness varied from those averages, looking at the series overall it was successful from an HP education perspective because the majority of respondents learned

something from each session. HP does not have in-person training sessions to directly compare the results of the virtual training sessions, but anecdotally the in-person training sessions through HP typically had fewer in-person attendees and were not regularly surveyed for feedback.

All of the lessons are publically available on Huron Pines' YouTube channel, as of December 3rd, 2020. As of October 1st, 2020, the recorded lessons have been viewed over 479 times. While some of those views can be written off as quality checking or a few views from HP coordinators, the vast majority are new learners or those who attended the sessions live and are refreshing their knowledge. The bulk of the views immediately followed the series, yet even as of September 2020 those numbers were continuing to increase without any additional marketing. This suggests that by using Zoom or other web-based meeting applications, educators can actually optimize content production by having a live session, recording it, and then uploading it for the public's consumption. HP even planned to reuse one of the videos from the series, "Unwind Outside", which was relevant to another program, without having to create new content. By utilizing already recorded content, time can be freed up to create content more efficiently.

Speaking to the "Unwind Outside" lesson specifically, the virtual attendance was 31 people, whereas when an in-person lesson was held through a local walking program later in the summer there were a total of nine attendees in-person. While the numbers for the previous year are not available, after speaking with the two staff members who ran the inaugural *Unwind Outside* program last year, nine attendees seemed to be consistent with what they expected despite the risks currently associated with meeting in-person. This

suggests that not only is there an interest in virtual education, that it can allow for a broader audience than what in-person programming alone can provide.

With "Unwind Outside" there were also elements of the in-person program that needed to be adapted to the virtual format. Specifically, three main techniques used by Huron Pines' educators needed to be adapted to help simulate a similar experience. Those three techniques are: Zoom In, Zoom Out, 5 Minute Listen, and Square Foot Partner Share. Zoom In, Zoom Out would normally show participants ways to "zoom in" on the minute details in nature and "zoom out" to focus on the larger ecology. In order to recreate that experience for virtual participants, images were used which showed a macro view for the Zoom In portion and then a larger landscape for the Zoom Out section. The 5 Minute Listen would normally encourage participants to close their eyes and listen to the nature world; this can be simulated through the use of an embedded video in the presentation. For the virtual "Unwind Outside" a YouTube video of a rainy forest was used as it mimicked the sounds they might experience while hiking in Michigan. Finally, the Square Foot Partner Share usually would take place with the whole group being broken up into pairs with each pairing analyzing a particular square foot area. This can help participants understand different perspectives by seeing how others can process the same visual information. During the "Unwind Outside" lesson the technique was discussed and done as a whole group, however Zoom's breakout rooms could have been utilized to separate attendees into pairs or small groups. Overall, with creativity and an understanding of the limitations of the software being used in-person learning techniques can be adapted for a virtual space.

3.2 Invasive Species Training

Moving on from the *Connecting to Nature* series, a series of other training sessions to suit the demand for a deeper dive into invasive species were created. The two programs for this series covered purple loosestrife alone and the other looked at a combination of invasive shrubs: autumn olive, common buckthorn, glossy buckthorn, and Japanese barberry (see List of scientific binomial names, page IX). For these sessions, the goal was to introduce interested participants to citizen science via reporting invasive species to the Midwest Invasive Species and Identification Network (MISIN). Members of the community had expressed interest in both identification and reporting sessions on invasive species, and due to the prevalence of purple loosestrife at the time of content creation it seemed a natural choice. After the implementation of a training focused on a single species, the invasive shrubs training was created to see if the idea could be extended to present on multiple priority species. All of the invasive species chosen are moderate to high priority species for the HP service area.

These virtual programs were each broken down into two parts: identification and reporting. Identification covered the basic natural history for each species -- where it came from, its habitat preferences, and common look-alikes -- and the reporting training handled where to actually submit field data collected on any invasive species to help local conservation organizations identify priority areas for treatment of these species.

The two-part *Purple Loosestrife Training* took place on Tuesday August 4th and Thursday August 6th, with the first session covering identification of purple loosestrife live and the second session handling how to actually report instances of invasive species

to MISIN live. Ten participants attended the first session, while six of them returned for the second session. The *Invasive Shrubs Workshop* took place on Tuesday September 15th with only the second session happening live on Zoom. Differing from the *Purple Loosestrife Training*, the first session was pre-recorded and sent to participants along with the pre-survey. This change was made to better understand if there was any value in pre-recording sessions, as well as to test distance learning techniques.

In a change from *Connecting to Nature*, access to these trainings was restricted by requiring registration ahead of time, which allowed pre-surveys to be sent out to better gauge the educational impacts of the programs. The survey statements were posed using a Likert scale, asking participants to choose one of five selections, which were then numbered for data processing: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), and Strongly Agree (5). If a statement's response increased by one point between the pre- and post-survey, then there was a positive increase in understanding on the topic, with the reverse also being true. The statements are included below in their entirety (Table 1.1 and Table 1.2). A Likert scale was used in order to simplify analysis, as well as being a survey method commonly used by HP.

From the *Purple Loosestrife Training*, there was an average increase by 1.89, from an average of 2.8 in the pre-survey to an average of 4.69 in the post-survey (Table 1.1). This translates back to respondents having been generally a little less than neutral on the statements prior to attending the training, and then being able to more strongly agree after the training.

For the *Invasive Shrubs Workshop*, the format was slightly tweaked to have the initial training session be a video for registrants to watch at their leisure ahead of the second session on reporting, which was then presented live. It is worth noting that some of the attendees also had attended the *Purple Loosestrife Training* which may explain why some statements are marked higher in the pre-survey, specifically "I can explain what an invasive species is to a friend" and "I know where to report instances of invasive species" (Table 1.2). Overall, the average change for this training was only a 1.1 increase towards agreement, from 2.7 in the pre-survey to 3.8 in the post-survey.

While these programs were unique to HP and that this was their debut, from what was understood via the EE coordinator and other staff members, the attendance was not hindered by the online format. In fact, it seemed to be on par with traditional in-person attendance for similar lessons, where typically between five and ten people might be expected.

Table 1.1. Change in average response values for the virtual Purple Loosestrife Training for general public participants. Responses were based on a Likert scale (1-5) with 1= strongly disagree and 5= strongly agree.

	Pre-Survey (n=10)	Post-Survey (n=7)	Change in Value
I can explain what an invasive species is to a friend.	3.8	4.7	+0.9
I can identify purple loosestrife in the wild.	2.7	4.8	+2.1
I am aware of at least one look-alike plant to purple loosestrife.	2.2	4.5	+2.3
I can name one quality that makes purple loosestrife invasive.	3.4	4.8	+1.4
I can point out the preferred habitat of purple loosestrife in the wild.	3.0	4.8	+1.8
I know where to report instances of purple loosestrife.	1.7	4.5	+2.8

Table 1.2. Change in average response values for virtual Invasive Shrubs Workshop for general public participants. The change in values isolating the four post-survey respondents are recorded as well. Responses were based on a Likert scale (1-5) with 1= strongly disagree and 5= strongly agree.

	Pre-Survey (n=12)	Post-Survey (n=4)	Change in Value (All)	Change in Value (Isolated)
I can explain what an invasive species is to a friend.	4.5	4.5	0.0	0.0
I can identify autumn olive in the wild.	2.7	3.5	+0.8	+1.5
I can identify common buckthorn in the wild.	2.0	3.5	+1.5	+2.0
I can identify glossy buckthorn in the wild.	2.0	3.5	+1.5	+2.0
I can identify Japanese barberry in the wild.	2.7	4.0	+1.3	+1.8
I can name at least one lookalike plant for autumn olive, buckthorn and Japanese barberry.	1.6	2.8	+1.2	+1.5
I know where to report instances of invasive species.	3.5	4.5	+1.0	+1.3

3.3 Other Examples and Online Programs

During the service year, having had the ability to partner with and attend other organizations' programming allowed for a better understanding of some of the nuance involved in creating buy-in online. Much like in-person sessions, preparation time for virtual presentations always takes considerably longer than one might initially expect. Participant connection to lessons can decrease by not having regular meetings or having too much time between individual lessons. While many things can happen with the creation of online programming, those two seemed to be the most notable cautions.

While creating both months' content for *Connecting to Nature*, it was found that the 30 minute presentations always took several days to put together cohesively, as well as a minimum of two meetings were needed to practice the back-and-forth for the presenters and moderators in order to keep the presentation flowing correctly. In providing technical assistance for a *Vernal Pool Monitoring* training session, hosted by the Michigan State University Extension, it was evident that multiple practice sessions were needed to keep presentations cohesive. For that training, several different presenters had to be coordinated, with moderators handling breakout rooms through Zoom to move participants between the presentations. Both programs showcased the necessity of proper planning, especially in a virtual setting.

When online programs did not follow a weekly schedule there seemed to be a bit of disconnect between the participants and the material. The *4-H Gardening Club*, originally began as a weekly meeting which saw relatively regular attendance by the five elementary school participants. After the first month, it switched to an every-other-week

schedule, which had less regular attendance. The program was ultimately cut short due to low continuing interest. For the Michigan Master Naturalist program, which I attended as a HPA member, the meetings were held once a month from May through October. While the information in each two-hour session itself was not overwhelming, the several weeks between lessons made it jarring for participants to come back to the course monthly. Both of these programs exceled in their virtual implementation, however could have benefited from slight tweaks to their timeframes.

In general, it is admirable to adapt existing in-person programs for an online format. This year it was mandatory in order to keep educational programs afloat, which meant that programs needed to be flexible. While many improvements could be made, such as in the examples above, having successful online programs is a feat in itself. As educators continue to learn what works and what does not for a particular program, the future of online education looks bright.

3.4 HPA Fieldwork and Environmental Education

Fieldwork can be a boon to the environmental educator's toolkit. Direct experience with the natural world adds an extra layer of proficiency to lessons on the topic. Effective environmental education relies on an intrinsic understanding of the topic. Having field days in conjunction with teaching days provides knowledge through hands-on approaches combined with thoughtful reflection. With improvements to communication and pre-scheduling field days to support teaching sessions, this could be a very effective model for any future environmental educators at HP. The idea of pre-scheduling the field days

would allow the HPA member to spend one or two days in the field for a particular species or ecosystem, followed by office days in order to create a teaching session/program on that particular species or ecosystem. Lessons could then be either recorded, for future implementation of the content, or presented live – or a hybrid of both, as was done during the *Invasive Shrubs Workshop*.

Field days took place over the course of 21 days during my service, beginning in June and ending in September. The bulk of those (33%) were spent surveying for invasive species at campgrounds and trails within the HP service area. Autumn olive and spotted knapweed were of particular interest during the surveys, though any invasive species was reported. The second most number of field days (19%) were spent establishing baseline monitoring data at Huron Pines' two preserves: Emily Min Hunt Nature Preserve and Hubbard Lake Nature Preserve. During those days, plots within selected management units were randomly sampled to document the ecology of the units before the implementation of any management practices on the properties. Any remaining field days were spent at Camp Grayling, pulling or inventorying invasive species, or helping with a tree and mast planting project in the Pigeon River Country State Forest.

When preparing to lead the invasive species training sessions, field days interacting with invasive species proved to be invaluable. Correct identification was certain since many of the photos used in the presentation were of the specimens which had been removed. Additionally, those photos served as visual appeal. Anecdotes from the field were also useful in gaining participant interest, and occasionally proved to be entertaining to participants. Learning directly from resource professionals also served to aid the

presentations, as they had tips for identification which they shared. For example, one commenter mentioned that they appreciated the pneumonic devices used in the *Invasive Shrubs Workshop* to identify autumn olive and Japanese barberry, which had been taken from the Stewardship Team Lead at HP.

4 Potential Futures of Virtual Programs

One program that was presented in-person was *Unwind Outside*. Partnering with the Crawford County Commission on Aging (CCCOA), their standard walking program was modified to include pre-walk stretching, mindfulness, and nature observation to create a more holistic program. The latter pieces are staples of the *Unwind Outside* program. It had been originated the year before at Huron Pines (HP) by Emily Vogelgesang and Abigail Ertel. For the Huron Pines AmeriCorps (HPA) commitment, I attended the first and last sessions which allowed for interaction with the participants who seemed excited to engage in the program. In the future, a virtual program dovetailing with the walking program would be an interesting idea for HP to explore. This would allow it to be continued throughout the year, keeping participants engaged in mindful nature practices beyond the walks.

While at HP it seemed as though there was interest in future programs around edible plants in the region. Some of the pieces implemented while working as a teaching assistant for the MTU Wild Foods course could be useful. During that course, which took place in the summer of 2019, the majority of the lessons were online with a few field outings to apply the ecological knowledge. The course focused on traditional ecological knowledge surrounding many of the edible and medicinal plants in the Keweenaw Peninsula. For the most part, students seemed to engage with the content, despite it being both summer and an online format. Partly this was likely due to the applicability of the material and their interest in it. Knowing that they would have field excursions to test their knowledge, as well as acquire useful tactile memories, surely helped as well.

Additionally, even the online portion was interactive with discussion forums and quizzes. One last piece that aided in that course's success was its use of place based stewardship education through its focus on the Keweenaw Peninsula.

For the community areas that HP covers, one of the biggest challenges when creating virtual programs is accessibility. After all, discussion on whether or not virtual education aids in learning is moot if the potential participants cannot access the material. According to the census, the average poverty rate for the twelve counties in Huron Pines' service area is 16.15%, 3.05% higher than the national average. In fact, one of the *Unwind Outside* programs was intended to be run as a hybrid between virtual and in-person sessions, but due to internet accessibility concerns for the audience it was canceled. While there was no opportunity during the service year to mitigate accessibility concerns, there are potential ways to maneuver around barriers to education.

Even though many virtual lessons are presented with a visual component, if access to internet is unstable, many platforms allow participants to join via their phones by calling in. As that only provides the audio, the presenter would either need to make sure that the participants had copies of the notes or made sure to talk through the visual elements within the presentation – preferably a combination of both methods. In fact, both of those are good practices for increasing reach within segments of the population with disabilities. This is where hybrid programs can help to increase overall accessibility for programs. By allowing for issues surrounding transportation and inconsistent access to internet to be mitigated through offering elements of in-person and virtual lessons, there

is the potential to include even more participants in a community education program. Anything to increase accessibility would certainly be a start.

5 Conclusion

Virtual offerings are not true substitutes for time spent in the field, but can prove to be a boon to environmental educators nonetheless. Through virtual programming, Huron Pines (HP) connected to audiences beyond its service area, and had the opportunity to engage with more people than in-person programs alone. Serving during COVID-19, pushed program development in a completely different way than had ever been conducted for HP previously. Going forward, those online offerings have now been recorded, and in some cases uploaded, allowing for them to be used beyond this year alone and potentially reducing the workload of future Huron Pines AmeriCorps (HPA) members. The environmental education (EE) segment of HP also has several new techniques planned for incorporating more of the novel technologies used in future program creation. In general, four of the main areas that should be focused on when creating virtual programming in the future are: consistency, accessibility, flexibility with hybrid programs (where in-person and virtual programs can be used to supplement each other), and maximizing instructor time in field to increase efficiencies of their programs.

EE is necessary and must continue in order for members of society to become better environmentalists. By optimizing programs to incorporate remote techniques, educators can safely and efficiently continue teaching even in the uncertainty surrounding COVID-19. The benefits of online education extend beyond the viral containment efforts, in that they can also give teachers back time and allow students to work at their own pace for many programs. Since modern students favor online sources for news and information, educators who engage in those platforms for teaching have the potential to reach a wider

audience, as well, than what in-person alone can provide. Online education has benefits that we are only beginning to harness, and it truly is the future of education.

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A "Great Stories" from HPA Service, Relating to Environmental Education

A.1 Great Story 1 – Warbling on About Education

When I was asked to help out a fellow Huron Pines AmeriCorps member and present on the Kirtland's Warblers, I was thrilled… and subsequently realized that I knew nothing about the little birds. Would I even be a good substitute? It seemed easy enough, the material had already been created, and I just needed to read off of a PowerPoint. However, my anxiety got the better of me -- and it sure paid off. Instead of opting to simply memorize the PowerPoints, I delved into whatever information I could find on the Kirtland's Warblers.

For example, did you know that they only nest for breeding under jack pine trees which are five to twenty-five feet tall, translating to approximately six to sixteen years in age? Or how about the fact that they nest on the ground at all? One of the most interesting assumptions that the kids pointed out is that they could not believe that birds might nest on the ground. Even after stating the fact they do nest on the ground, inevitably one or two would suggest that younger, branchier jack pines were chosen so that the babies did not fall out of the tree.

Learning is such an interesting experience because once you truly understand a subject, it becomes hard to remember what it was like before you understood it. For me, after extensive reading on the subject, it now seems like a no brainer that Kirtland's Warblers nest on the ground, but for the kids it was often a completely new concept. That alone is

one of the most driving forces in this service for me -- getting to see the ideas I have studied through the eyes of those experiencing them for the first time.

While the Kirtland's Warblers and I have only recently become acquainted, I look forward to being able to talk ad nauseam about wildflowers, trees, soils, pollinators, and waterways with fellow community members and see their eyes light up with the brilliance that comes when a passion is ignited. Even though that may still be a while away, with quarantine and the Stay at Home Order, there is still a great level of connection between the content that I have been developing and the community. It is both exciting and encouraging.

As an aside, I also want to say that I was deeply moved when a little kindergartener at Ella White Elementary in Alpena, Michigan hugged me while I was there observing Celeste (a fellow HPA member who implemented the majority of Kirtland's Warber programming). I did not present or do anything more than give positive feedback on her cut-out of a Kirtland's Warbler and let her pet the stuffed Kirtland's Warbler, but apparently that was enough for her to feel a bond with me. That is another piece that keeps me going and makes me love environmental education: the natural connections you make with people, even when you are not trying to.

A.2 Great Story 2 – Environmental Education in the Era of Stay in Place

Only about a month and a half into my service when the COVID-19 pandemic hit Michigan. It quickly became clear that all remaining March and April events would be postponed indefinitely while our communities worked to combat the virus. This meant

that where there had been an amount of certainty concerning my next several months suddenly there was a flood of uncertainty. Luckily, we live in an age where technology dominates. As such, lessons could be cannibalized from existing programming or upcoming programming to create what we called the "Connecting to Nature" series. It ended up having nine total episodes recorded weekly, where I presented information and facilitated the conversation during April and May respectively. While this wasn't the only switch that was made, it was by-and-far the most successful piece of programming I could have hoped for. With over 400 views total, it was striking how many people tuned in to connect with us -- and with nature. Even at the end, there were emails coming in asking when the next lesson was going to be held. It was rewarding to say the least to have such positive feedback from the community.

A.3 Great Story 3 – Fieldwork: A Crane in the Neck

Fieldwork is fun. That's the core tenant that I follow when out in nature with fellow staff members. However, sometimes it becomes more exciting than you could ever anticipate. While out on a routine invasive species survey, we had our noses to the ground in search of spotted knapweed and St. John's wort. In brief pause to look ahead at the small jack pine stand ahead of me, I noticed a figure darting between the trees. As it was roughly human-sized I was vaguely concerned since there was only supposed to be two of us in the field. Moving a little closer we were startled to have startled a pair of Sandhill cranes in search of lunch. For those of you unfamiliar with Sandhill cranes -- or if you have only seen them on the roadside or through binoculars -- they are approximately 44" tall. Imposing is one word you could use to describe them. Very chatty, we heard their calls

up close and personal, with such distinct vocalizations that I could be swayed to become a birder. However, after being circled by them, we decided to creep off and survey a different section of land so as not to further agitate them -- after all, no one can really enjoy a spot of lunch while being gawked at by strangers and they seemed peckish. I knew that serving with Huron Pines would allow me a chance to be right in the heart of nature, but I never knew quite how close I could get. I cannot wait to see what other adventures await me as I continue my service!

A.4 Great Story 4 – The Circle of Life

It's funny to reflect on where life can take you. For me, I traveled from Midland, MI to the Upper Peninsula for college and stayed there until my AmeriCorps year brought me back downstate. Other than the occasional trip to see friends or a high school reunion, I had no reason to ever really come back to Midland. However, with the recent dam break and social media filled with old friends who had been affected by the flooding my connection to Midland became more prominent than it has been in years. No day was this more evident than during our member celebration's Day of Caring, in which several of us involved with HPA united with the folks at the Little Forks Conservancy in Midland to help clean up one of their preserves. As an interesting additional connection, before graduating high school I had been added to the Little Forks Conservancy's mailing list as a volunteer -- although none of the times had lined up for me to help out while I was there. So, for me, the Day of Caring was more than just helping out a fellow service member, it also served to give back to the community that helped to raise me as well as

reconnect me to an organization that I never thought I would actually have the chance to help out.